PRECAST CONCRETE SUBSTRUCTURES GENERAL NOTES

GUIDELINES

THESE GUIDELINE DRAWINGS REPRESENT TYPICAL DETAILS FOR THE DESIGN AND DETAILING OF PRECAST CONCRETE SUBSTRUCTURES.

THESE SHEETS ARE INCLUDED TO PROVIDE AN EXAMPLE OF THE DRAFTING LAYOUT OF TYPICAL PRECAST CONCRETE SUBSTRUCTURES. SEVERAL DIFFERENT SUBSTRUCTURE TYPES ARE SHOWN. THE DETAILS WILL COVER A MAJORITY OF THE SUBSTRUCTURES USED IN UTAH.

DETAILS AND REINFORCEMENT SHOWN ARE SCHEMATIC. DESIGN AND DETAIL EACH SUBSTRUCTURE ACCORDING TO THE SPECIFIC REQUIREMENTS OF EACH BRIDGE.

SET THE LOCATION OF THE LONGITUDINAL REINFORCING STEEL BASED ON THE SIZE OF THE GROUTED SPLICE COUPLER, ANY REINFORCING STEEL AROUND THE COUPLER, AND THE CLEAR COVER REQUIREMENTS FOR THE ELEMENT. ACCOUNT FOR THIS IN THE DESIGN OF THE ELEMENT.

ALL REINFORCING STEEL DIMENSIONS ARE TO THE CENTERLINE OF THE REINFORCEMENT.

SIZES OF ELEMENTS:

WIDTH: THE MAXIMUM WIDTH OF THE ELEMENT AND ANY PROJECTING REINFORCING SHOULD BE KEPT BELOW 14FT FOR SHIPPING REASONS

WEIGHT: THE MAXIMUM WEIGHT OF EACH ELEMENT SHOULD BE KEPT TO LESS THAN 100KIP.

HEIGHT: THE MAXIMUM HEIGHT OF ANY ELEMENT INCLUDING PROJECTING REINFORCING SHOULD BE KEPT TO LESS THAN 10FT FOR SHIPPING REASONS.

IMPLEMENTATION

IT IS THE DESIGNER'S RESPONSIBILITY TO:

DESIGN AND DETAIL ALL SUBSTRUCTURE ELEMENTS, INCLUDING BUT NOT LIMITED TO, COMPONENTS SUCH AS PIERS, ABUTMENTS, FOOTINGS AND FOUNDATIONS.

DESIGN AND CHECK THE SUBSTRUCTURE ELEMENTS FOR ALL ANTICIPATED LOADS

DETAIL DIMENSIONS OF ALL ELEMENTS INCLUDING INTERNAL REINFORCING.

CALCULATE ELEVATIONS OF TOP OF ALL PRECAST ELEMENTS. ELEVATIONS TO BE INCLUDED ON ALL DETAILS.

DETERMINE THE GEOTECHNICAL REQUIREMENTS OF THE SITE AND PLACE THE APPLICABLE INFORMATION ON THE PLANS.

PLACE APPLICABLE GENERAL NOTES ON THE PLAN SET.

ENSURE SUFFICIENT DETAIL IS ADDED TO THE DESIGN PLANS TO ENSURE PROPER FIT UP OF PRECAST ELEMENTS IN THE FIELD. TOLERANCE DETAIL SHEETS DEPICT A WORKING METHOD FOR ACHIEVING PROPER FIT UP.

CHECK THE HANDLING STRESSES IN EACH ELEMENT FOR THE LIFTING LOCATION SHOWN ON THE PLANS.

FOR DETERMINING THE MINIMUM SIZE OF THE CORRUGATED METAL PIPE FOR USE WITH THE SUBSTRUCTURE ELEMENTS USE THE FOLLOWING:

PIPE PILE: O.D. + 8″
H-PILE: PILE DIA. + 8″
DRILLED SHAFT: O.D. OF SPIRAL + 8″

GENERAL NOTES

DESIGN PRECAST CONCRETE SUBSTRUCTURE ELEMENTS IN ACCORDANCE WITH AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 4TH EDITION WITH ALL INTERIM PROVISIONS EXCEPT AS NOTED OTHERWISE.

PRECAST ELEMENT CONCRETE	f′c = 4000 PSI CLASS AA (AE)
CLOSURE POUR CONCRETE	f′c = 4000 PSI CLASS AA (AE)
NON-SHRINK GROUT	f′c = 4000 PSI @ 24 HRS.
REINFORCING STEEL COLUMNS	fy = 60,000 PSI ASTM A615 fy = 60,000 PSI ASTM A706

USE THE UTAH DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION (THE LATEST EDITION AND SUPPLEMENTS THERETO WHICH ARE IN EFFECT AT THE DATE OF REQUEST FOR BIDS) FOR MATERIALS, CONSTRUCTION, AND WORKMANSHIP.

PROVIDE 2″ CLEAR COVER FOR REINFORCING IN ALL SUBSTRUCTURE ELEMENTS UNLESS OTHERWISE NOTED. PROVIDE 3″ CLEAR COVER FOR ALL FOOTINGS.

CONTRACTOR TO PROVIDE TEMPORARY BRACING FOR ALL ELEMENTS UNTIL CONNECTIONS HAVE ACHIEVED ADEQUATE STRENGTH. SEE SPECIAL PROVISIONS.

SHOW LIFTING LOCATIONS FOR ALL COMPONENTS. CONTRACTOR TO DESIGN THE LIFTING HARDWARE.

THE CONTRACTOR MAY SUBSTITUTE ALTERNATE LEVELING DEVICES PROVIDED THEY CAN PRODUCE A STRUCTURE WITHIN THE SPECIFIED ERECTION TOLERANCES.

USE A TROWEL FINISH ON THE TOP SURFACES OF ALL ELEMENTS.

CHAMFER ALL EXPOSED EDGES AND CORNERS ¾″.

SHOW ESTIMATED SHIPPING WEIGHTS FOR ALL PRECAST ELEMENTS ON CONTRACT DRAWINGS.

COAT ALL MILD REINFORCEMENT PER UDOT SPECIFICATIONS UNLESS OTHERWISE NOTED.

PLACE DRILLED SHAFTS AND DRIVEN PILES WITHIN A HORIZONTAL TOLERANCE OF 3 INCHES IN PLAN.

INDEX OF SHEETS

REVISIONS

NO.	DATE	BY	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
SALT LAKE CITY, UTAH
STRUCTURES DIVISION

DESIGN | CHECK
DRAWN | CHECK
QUANT. | CHECK

APPROVAL RECOMM. — DATE — SENIOR DESIGN ENGR.

APPROVED FOR USE BY UDOT — DATE — UDOT BRIDGE ENGR.

TYPICAL DETAIL SHEET
PRECAST SUBSTRUCTURE
GENERAL NOTES

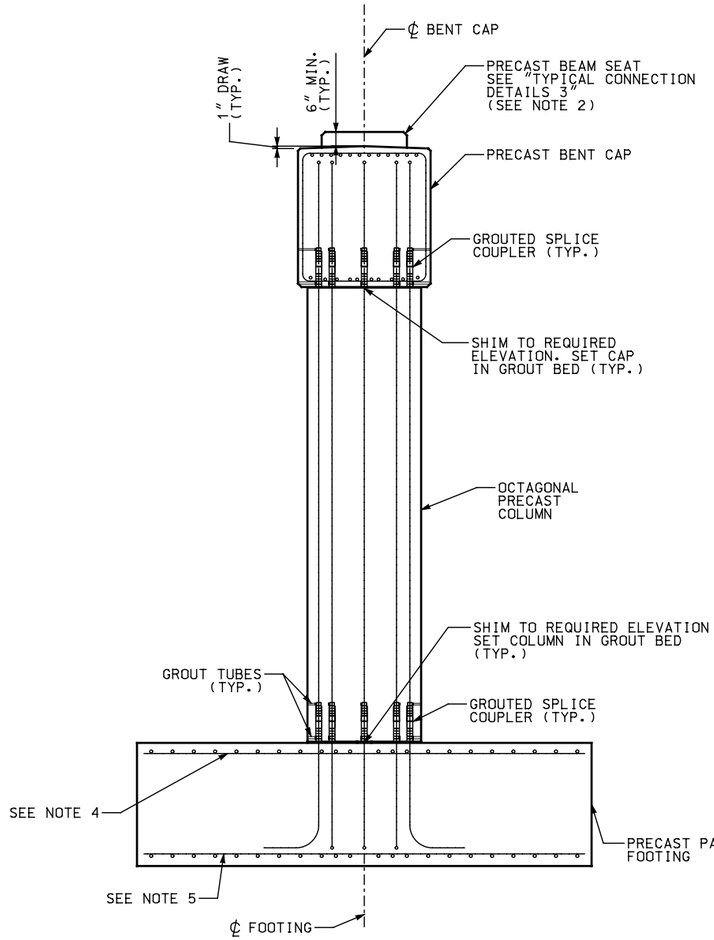
PROJECT NUMBER

COUNTY

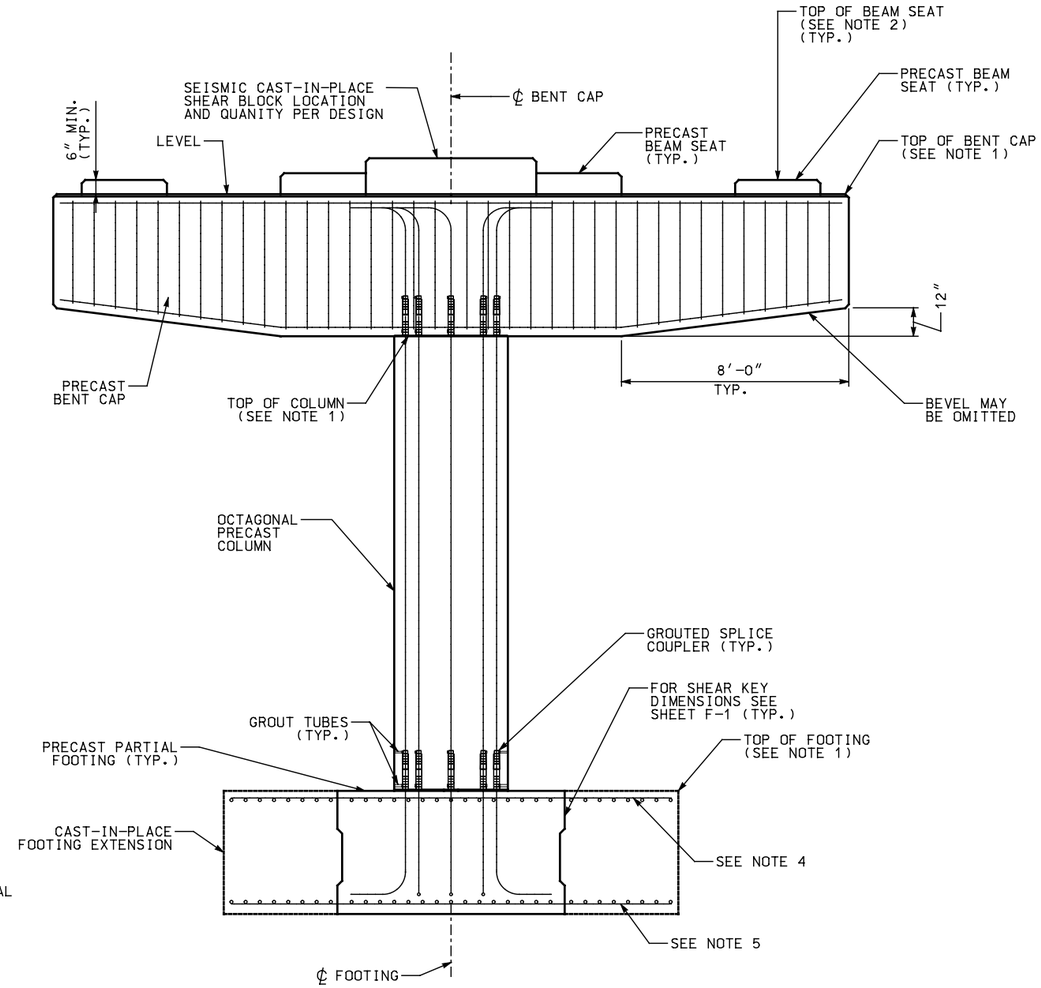
GNS - 1
DRG. NO.

SHT. OF

SUBSTRUCTURE GEN NOTES.dgn
4/30/2009



PRECAST SINGLE COLUMN BENT
SIDE VIEW



PRECAST SINGLE COLUMN BENT
ELEVATION

NOTES

1. ERECTION TOLERANCE ON ELEVATION $\pm 1/4"$.
2. ERECTION TOLERANCE ON BEAM SEAT ELEVATION $\pm 1/16"$. MAY BE SET HIGH AND GROUND TO SPECIFIED ELEVATION.
3. COLUMN SHEAR REINFORCEMENT NOT SHOWN FOR CLARITY.
4. DETAIL BAR EXTENSIONS TO THE LIMITS OF THE FOOTING IF POSSIBLE. IF TOTAL WIDTH OF FOOTING AND BAR EXTENSIONS EXCEEDS SHIPPING LIMITS, THEN DETAIL AS LAP SPLICES IN REINFORCING OR ADD MECHANICAL BAR SPLICERS (IF REQUIRED).
5. PROVIDE 3" CLEAR COVER FOR BOTTOM MATS OF FOOTING REINFORCING.
6. SEISMIC KEEPER BLOCK MAY BE PLACED BETWEEN OTHER BEAMS IF REINFORCING CONFLICTS ARISE.
7. FOOTING TO BE SET TO A TOLERANCE OF $\pm 1/4"$ IN 4 FEET.
8. USE CAST IN PLACE EXTENSIONS TO KEEP SIZE AND WEIGHT OF FOOTING WITHIN LIMITS.

REVISIONS

NO.	DATE	BY	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
SALT LAKE CITY, UTAH
STRUCTURES DIVISION

DESIGN | CHECK
DRAWN | CHECK
QUANT. | CHECK

APPROVAL RECOMM. — DATE — SENIOR DESIGN ENGR.

APPROVED FOR USE BY UDOT — DATE — UDOT BRIDGE ENGR.

TYPICAL DETAIL SHEET
PRECAST BENT
SINGLE COLUMN BENT

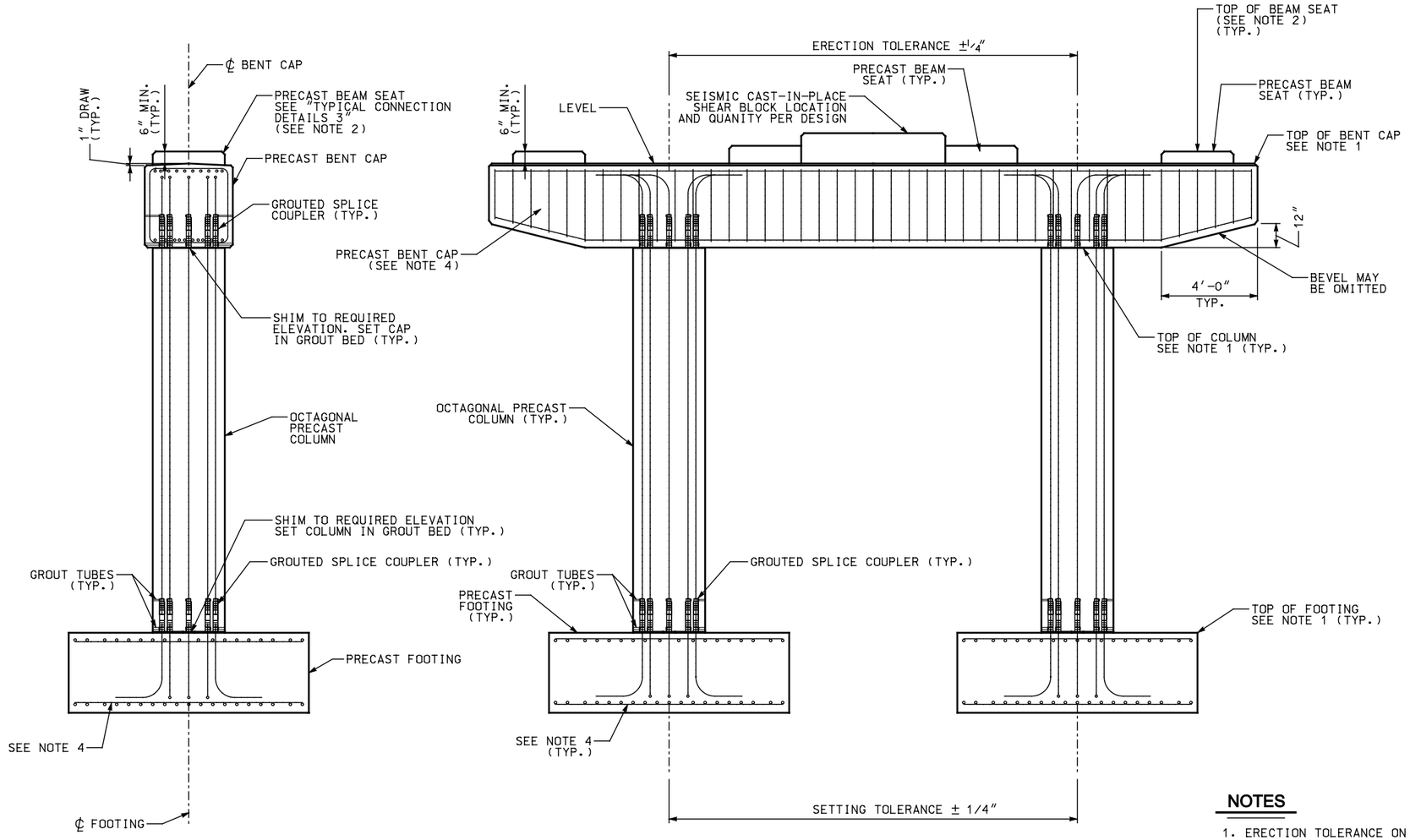
PROJECT NUMBER

COUNTY

P - 1
DRG. NO.

SHT. OF

plans.dgn
4/30/2009



PRECAST DOUBLE COLUMN BENT SIDE VIEW

PRECAST DOUBLE COLUMN BENT ELEVATION

NOTES

1. ERECTION TOLERANCE ON ELEVATION ±1/4″.
2. ERECTION TOLERANCE ON BEAM SEAT ELEVATION ±1/16″. MAY BE SET HIGH AND GROUND TO SPECIFIED ELEVATION.
3. COLUMN SHEAR REINFORCEMENT NOT SHOWN FOR CLARITY.
4. PROVIDE 3″ CLEAR COVER FOR BOTTOM MATS OF FOOTING REINFORCING.
5. FOOTINGS MAY BE MADE CONTINUOUS BY EXTENDING REINFORCEMENT AND CASTING A CLOSURE POUR, SIMILAR TO DETAILS ON SHEET F-1.
6. SEISMIC KEEPER BLOCK MAY BE PLACED BETWEEN OTHER BEAMS IF REINFORCING CONFLICTS ARISE.
7. FOOTING TO BE SET TO A TOLERANCE OF ±1/4″ IN 4 FEET.

NO.	DATE	BY	REMARKS

REVISIONS

UTAH DEPARTMENT OF TRANSPORTATION
SALT LAKE CITY, UTAH
STRUCTURES DIVISION

DESIGN — CHECK
DRAWN — CHECK
QUANT. — CHECK

APPROVAL RECOMM. — SENIOR DESIGN ENGR. — DATE
APPROVED FOR USE BY UDOT — UDOT BRIDGE ENGR. — DATE

TYPICAL DETAIL SHEET
PRECAST BENT
DOUBLE COLUMN BENT

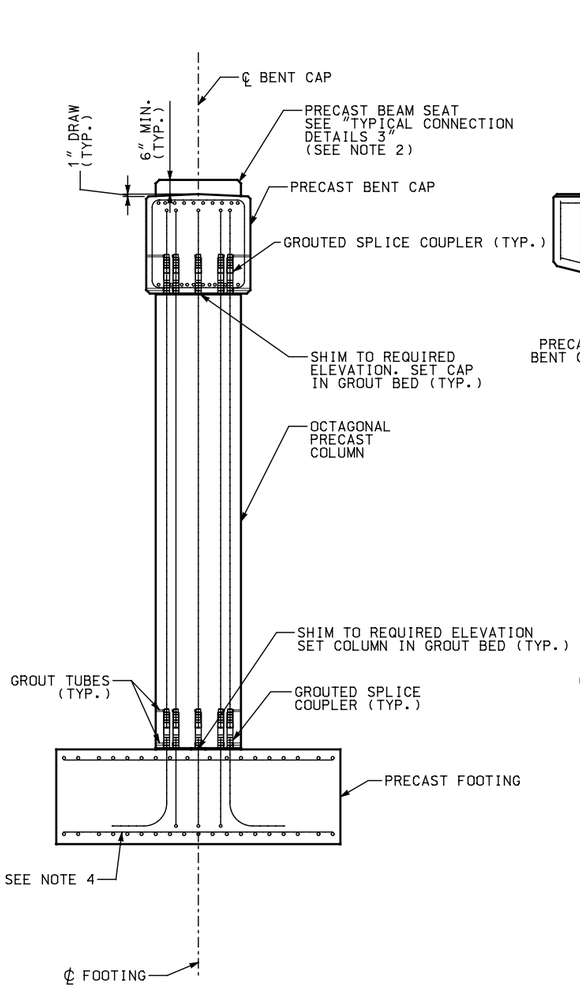
PROJECT NUMBER

COUNTY

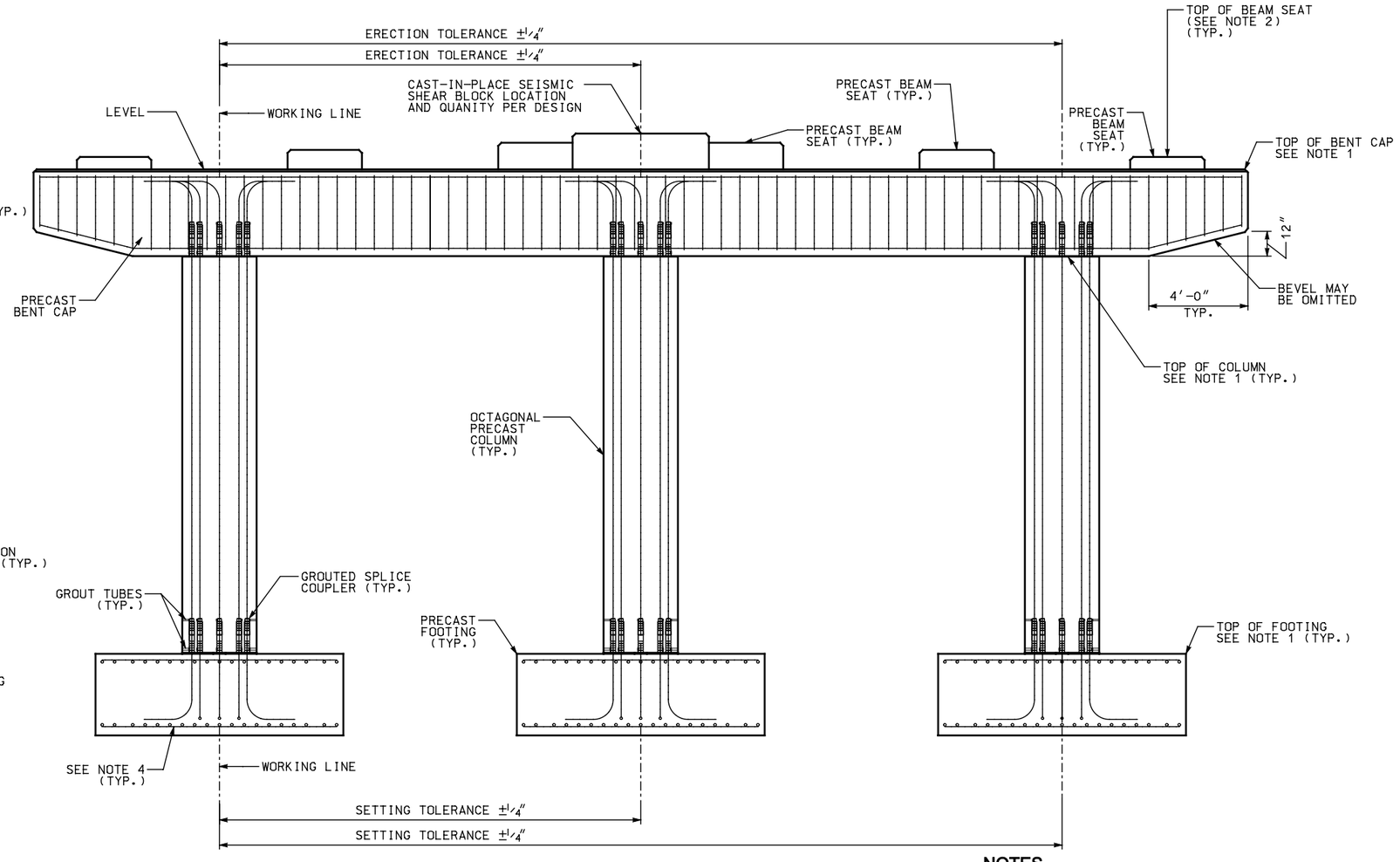
P - 2
DRG. NO.

SHT. OF

plans.dgn
4/30/2009



PRECAST TRIPLE COLUMN BENT SIDE VIEW



PRECAST TRIPLE COLUMN BENT ELEVATION

NOTES

1. ERECTION TOLERANCE ON ELEVATION ±1/4".
2. ERECTION TOLERANCE ON BEAM SEAT ELEVATION ±1/16". MAY BE SET HIGH AND GROUND TO SPECIFIED ELEVATION.
3. COLUMN SHEAR REINFORCEMENT NOT SHOWN FOR CLARITY.
4. PROVIDE 3" CLEAR COVER FOR BOTTOM MATS OF FOOTING REINFORCING.
5. FOOTINGS MAY BE MADE CONTINUOUS BY EXTENDING REINFORCEMENT AND CASTING A CLOSURE POUR, SIMILAR TO DETAILS ON SHEET F-1.
6. SEISMIC KEEPER BLOCK MAY BE PLACED BETWEEN OTHER BEAMS IF REINFORCING CONFLICTS ARISE.
7. FOOTING TO BE SET TO A TOLERANCE OF ±1/4" IN 4 FEET.

REVISIONS

NO.	DATE	BY	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
SALT LAKE CITY, UTAH
STRUCTURES DIVISION

DESIGN | CHECK
DRAWN | CHECK
QUANT. | CHECK

APPROVAL RECOMM. — DATE — SENIOR DESIGN ENGR.

APPROVED FOR USE BY UDOT — DATE — UDOT BRIDGE ENGR.

TYPICAL DETAIL SHEET
PRECAST BENT
TRIPLE COLUMN BENT

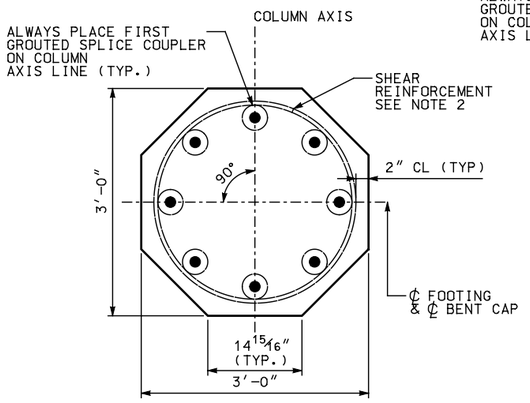
PROJECT NUMBER

COUNTY

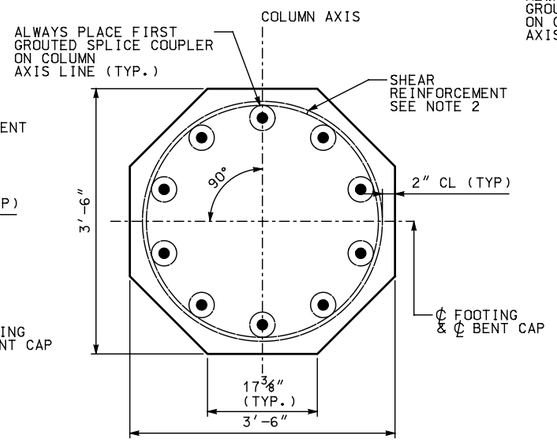
P - 3
DRG. NO.

SHT. OF

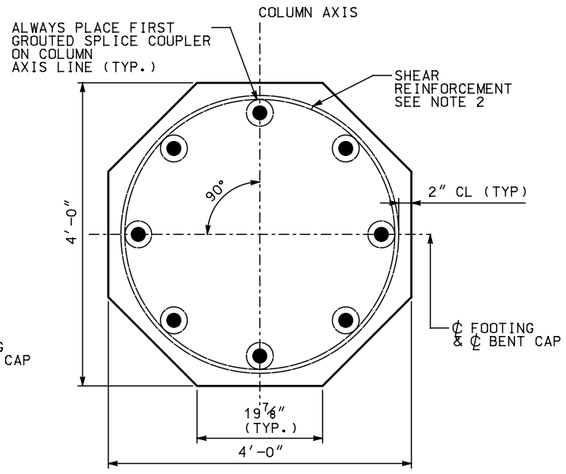
plans.dgn
4/30/2009



3'-0" COLUMN SECTION



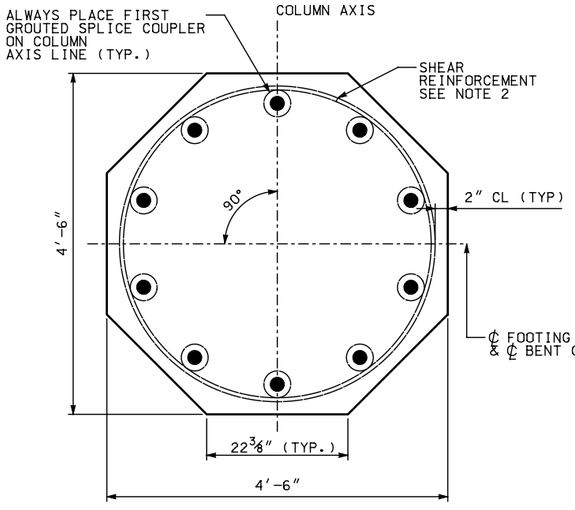
3'-6" COLUMN SECTION



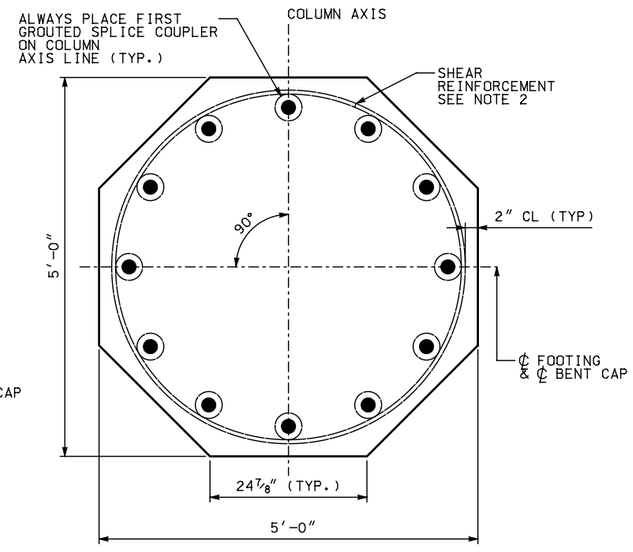
4'-0" COLUMN SECTION

NOTES

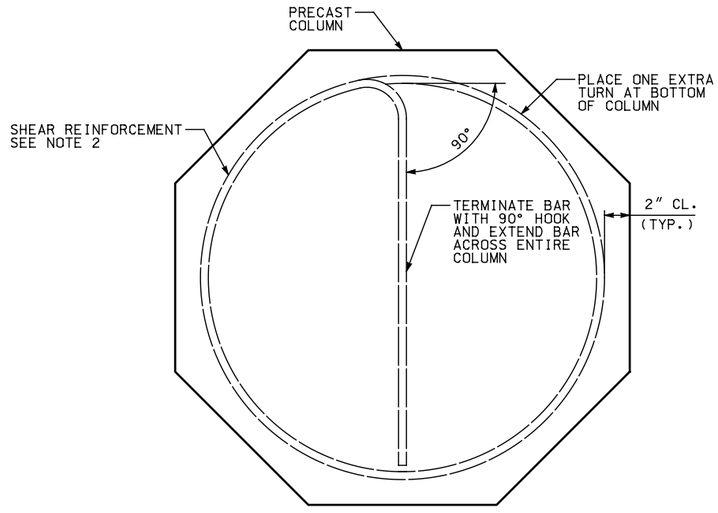
1. DETAILS SHOWN ARE BASED ON PROVIDING LONGITUDINAL REINFORCING EQUAL TO APPROXIMATELY 1.5 PERCENT OF THE GROSS AREA OF THE COLUMN. ACTUAL REINFORCING WILL VARY BY PROJECT BASED ON THE DESIGN.
2. SHEAR REINFORCEMENT USED FOR TRANSVERSE COLUMN CONFINEMENT REINFORCEMENT CONSISTS OF SPIRALS OR TIES CONNECTED WITH WELDED BUTT SPLICES.
3. IT IS NECESSARY TO PLACE THE FIRST GROUTED SPLICE COUPLER ON THE COLUMN AXIS LINE TO FACILITATE EASE OF CONSTRUCTION.



4'-6" COLUMN SECTION



5'-0" COLUMN SECTION



SHEAR REINFORCEMENT SPIRAL REINFORCEMENT TERMINATION

COLUMN VERTICAL REINFORCEMENT NOT SHOWN FOR CLARITY

NO.	DATE	BY	REVISIONS REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
SALT LAKE CITY, UTAH
STRUCTURES DIVISION

DESIGN — CHECK
DRAWN — CHECK
QUANT. — CHECK

APPROVAL RECOMM. — DATE — SENIOR DESIGN ENGR.
APPROVED FOR USE BY UDOT — DATE — UDOT BRIDGE ENGR.

TYPICAL DETAIL SHEET
PRECAST BENT
TYPICAL COLUMN SECTIONS

PROJECT NUMBER

COUNTY

P - 4
DRG. NO.

SHT. OF

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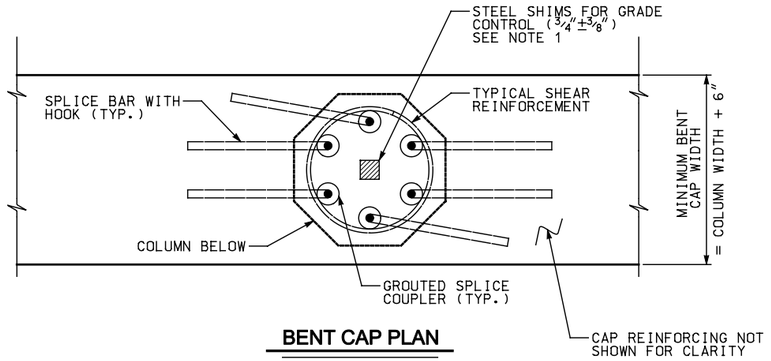
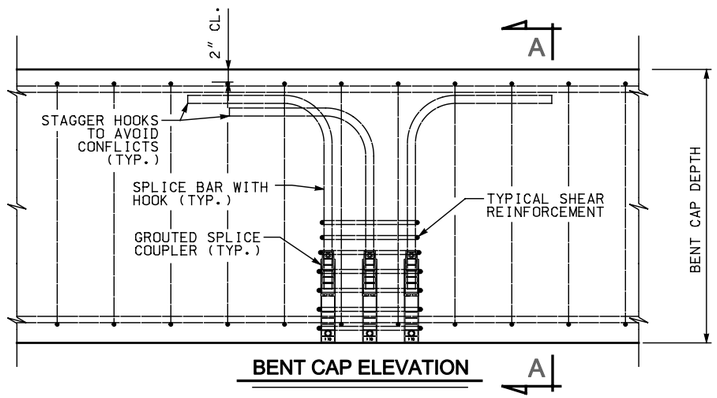
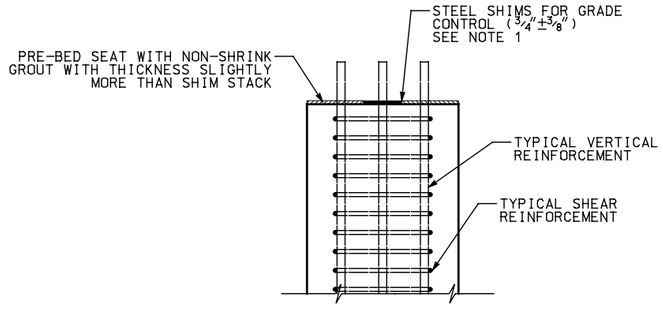
4/30/2009



BENT CAP PLAN

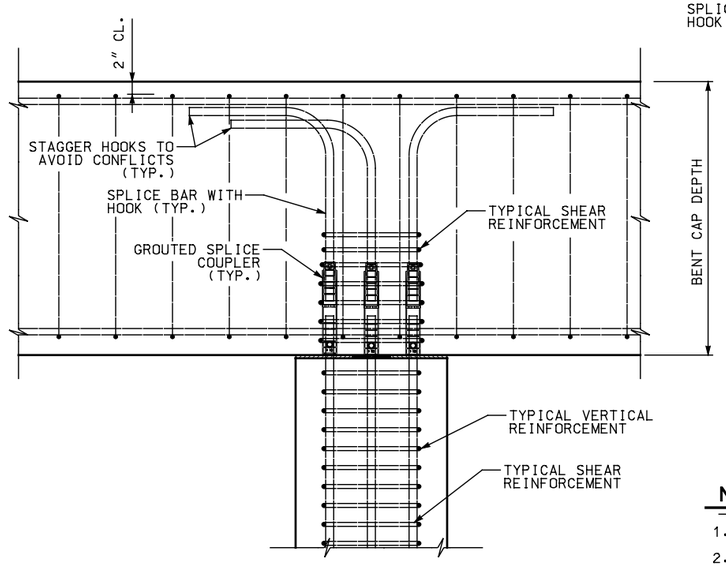


BENT CAP ELEVATION

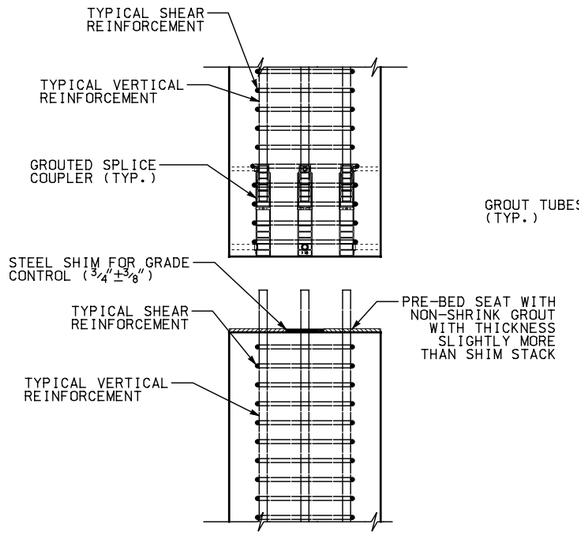


COLUMN ELEVATION

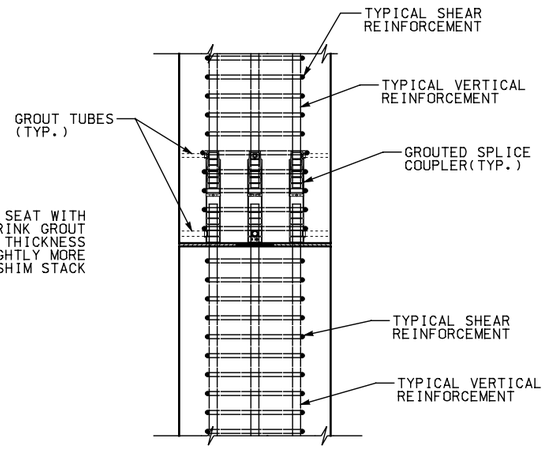
COLUMN TO BENT CAP CONNECTION PRIOR TO CONNECTION



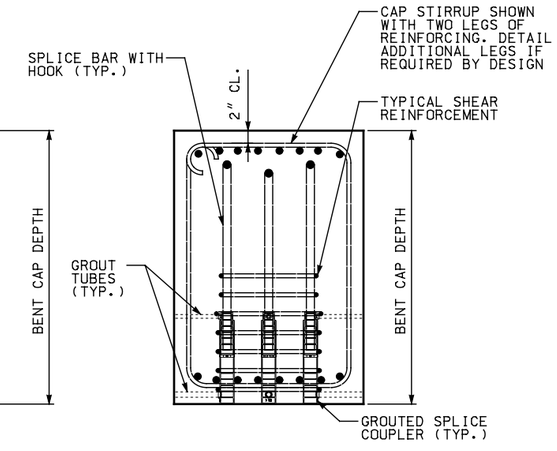
COLUMN TO BENT CAP CONNECTION AFTER CONNECTION



COLUMN TO COLUMN CONNECTION PRIOR TO CONNECTION



COLUMN TO COLUMN CONNECTION AFTER CONNECTION



SECTION A BENT CAP SECTION

NOTES

1. ADJUST SHIM STACK HEIGHT TO CONTROL ERECTION ELEVATIONS.
2. COLUMN TO COLUMN SPLICE SHOWN. THIS DETAIL MAY BE USED FOR TALL COLUMNS. COLUMN TO FOOTING DETAILS SIMILAR.
3. SHEAR REINFORCEMENT TO BE SPIRALS OR HOOPS WITH RESISTANCE BUTT WELDS.

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REVISIONS

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UTAH DEPARTMENT OF TRANSPORTATION
SALT LAKE CITY, UTAH
STRUCTURES DIVISION

DESIGN CHECK | DRAWN CHECK | QUANT. CHECK

APPROVAL RECOMM. DATE SENIOR DESIGN ENGR.

APPROVED FOR USE BY UDOT DATE UDOT BRIDGE ENGR.

TYPICAL DETAIL SHEET
PRECAST BENT
TYPICAL CONNECTION DETAILS 1

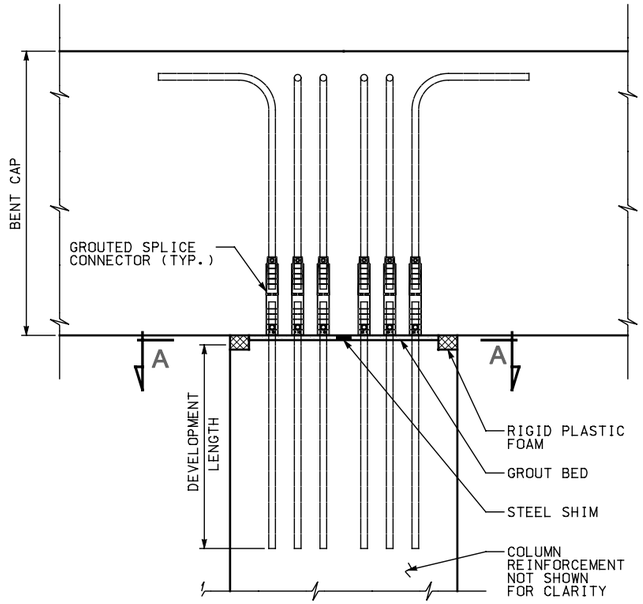
PROJECT NUMBER

COUNTY

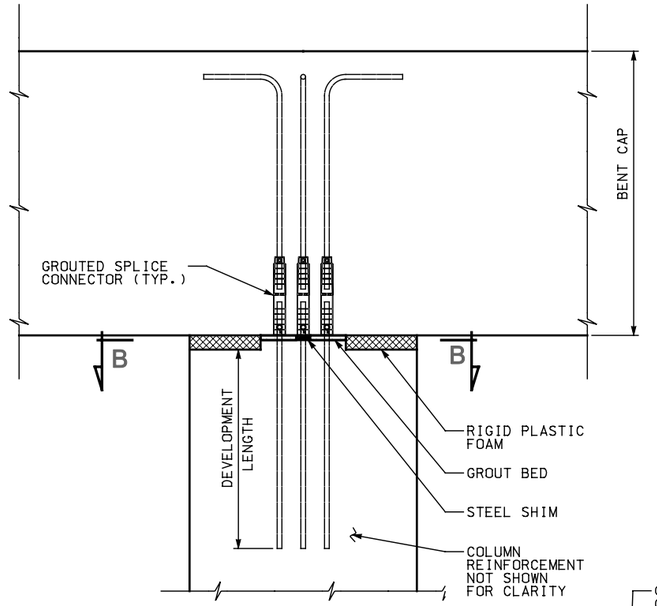
P - 5

DRG. NO.

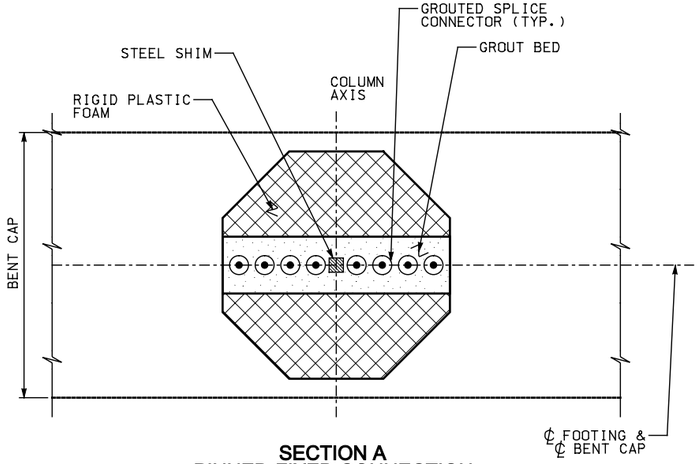
SHT. OF



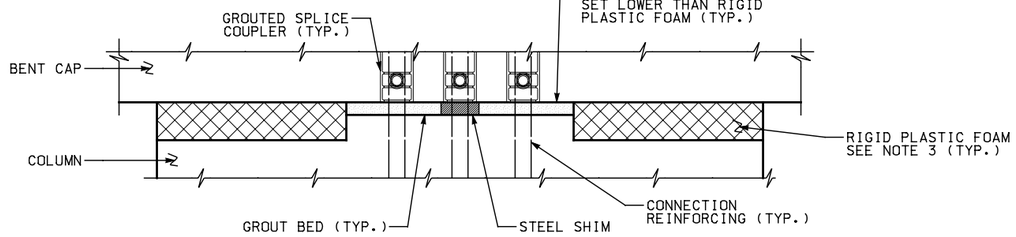
COLUMN CONNECTION PINNED-FIXED



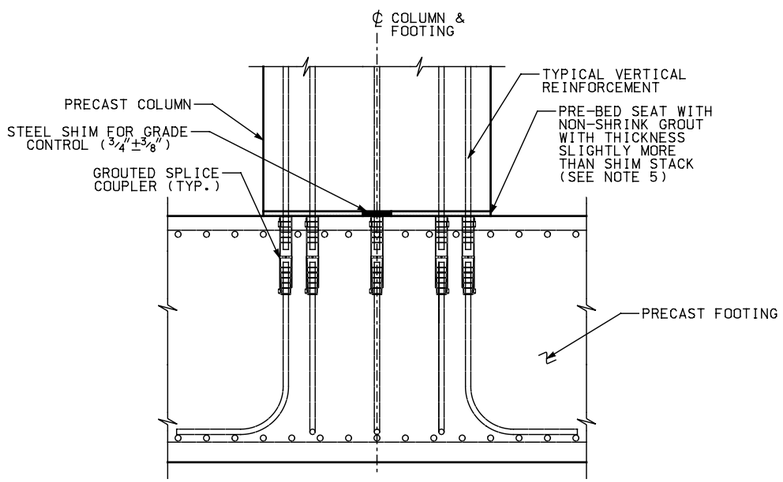
COLUMN CONNECTION PINNED-PINNED



SECTION A PINNED-FIXED CONNECTION

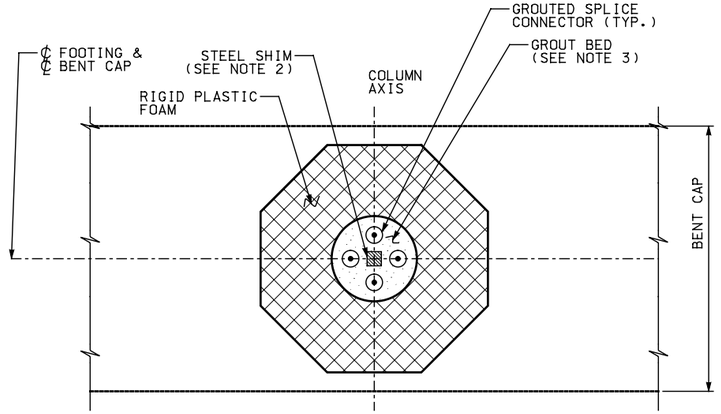


COLUMN TO BENT CAP GROUT BED DETAIL (COLUMN TO FOOTING DETAIL SIMILAR)



OPTIONAL PRECAST COLUMN TO FOOTING CONNECTION

SEE NOTE 4



SECTION B PINNED-PINNED CONNECTION

NOTES

1. SEISMIC KEEPER BLOCK, BEAM SEAT PEDESTALS, BENT, FOOTING, AND COLUMN REINFORCING NOT SHOWN FOR CLARITY.
2. FOR PINNED-PINNED OR PINNED-FIXED COLUMN TO FOOTING CONNECTION USE SIMILAR DETAILS.
3. THICKNESS OF RIGID PLASTIC FOAM TO BE DETERMINED BY THE DESIGNER BASED ON ANTICIPATED MOVEMENT.
4. CONNECTION OF COLUMN TO FOOTING SHOWN. THIS TYPE OF CONNECTION MAY ALSO BE USED FOR OTHER CONNECTIONS IN THE BRIDGE.
5. PLACE SHIM STACK AS NOTED ON PLANS. PLACE NON-SHRINK GROUT AROUND SHIM STACK WITHIN LIMITS OF CONNECTION OR RIGID PLASTIC FOAM, AND AS SHOWN ON PLANS. NON-SHRINK GROUT TO BE SLIGHTLY HIGHER THAN SHIM STACK TO ACHIEVE FULL CONTACT BETWEEN BOTH CONNECTION SURFACES.

NO. | DATE | BY | REVISIONS | REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
SALT LAKE CITY, UTAH
STRUCTURES DIVISION

DESIGN | CHECK
DRAWN | CHECK
QUANT. | CHECK

APPROVAL RECOMM. | SENIOR DESIGN ENGR. | DATE
APPROVED FOR USE BY UDOT | UDOT BRIDGE ENGR. | DATE

TYPICAL DETAIL SHEET
PRECAST BENT
TYPICAL CONNECTION DETAILS 2

PROJECT NUMBER

COUNTY
P - 6
DRG. NO.
SHT. OF

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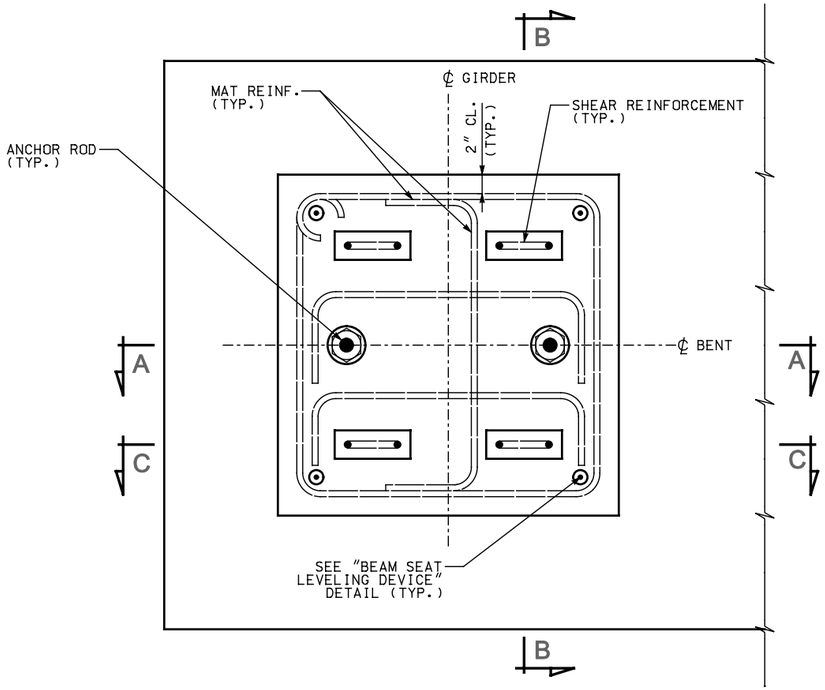
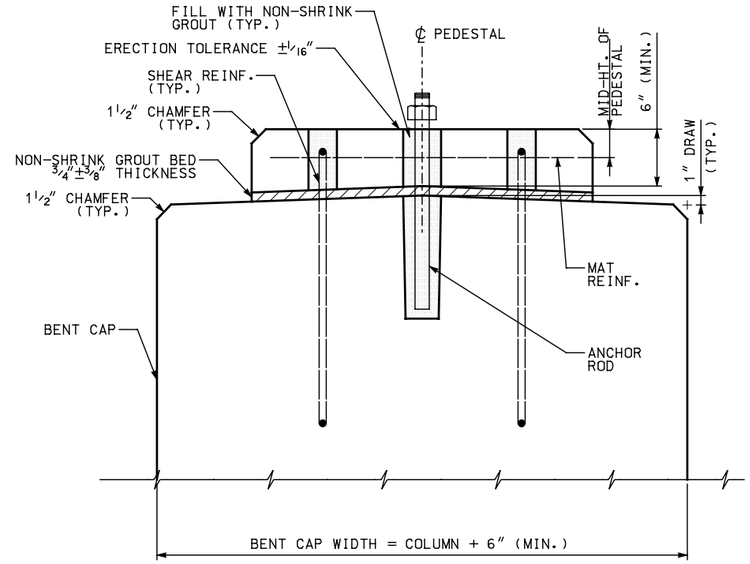
4/30/2009



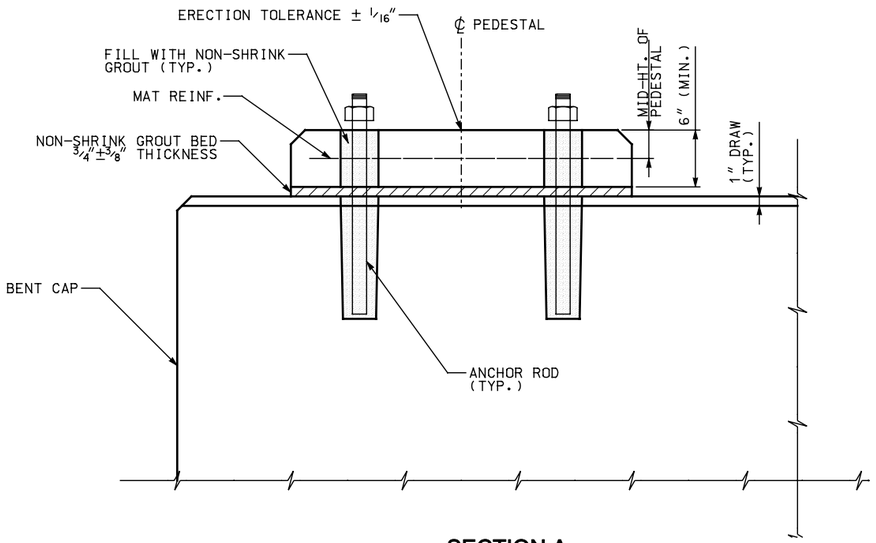
PLAN OF BEAM SEAT PEDESTAL ON BENT CAP

NOTES

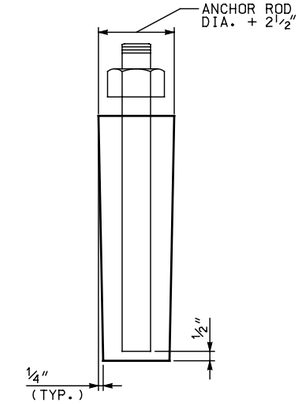
1. DETAILS SHOWN DEPICT A SINGLE PEDESTAL ON A BENT CAP. DETAILS FOR CANTILEVER ABUTMENTS AND BACK TO BACK BEAMS ON A BENT CAP ARE SIMILAR.



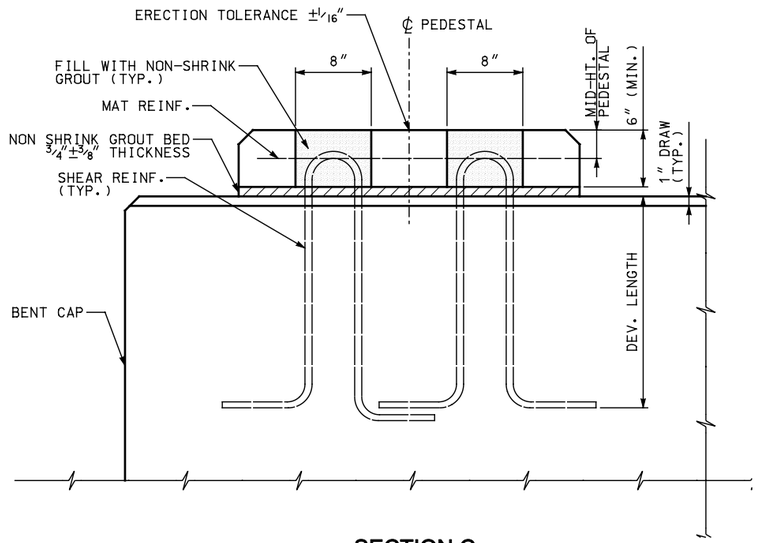
SECTION B



SECTION A



ANCHOR ROD FORM



SECTION C

NO.	DATE	BY	REVISIONS	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
SALT LAKE CITY, UTAH
STRUCTURES DIVISION

DESIGN | CHECK
DRAWN | CHECK
QUANT. | CHECK

APPROVAL RECOMM. — SENIOR DESIGN ENGR. — DATE
APPROVED FOR USE BY UDOT — UDOT BRIDGE ENGR. — DATE

TYPICAL DETAIL SHEET
PRECAST BENT
TYPICAL CONNECTION DETAILS 3

PROJECT NUMBER

COUNTY

P - 7
DRG. NO.

SHT. OF

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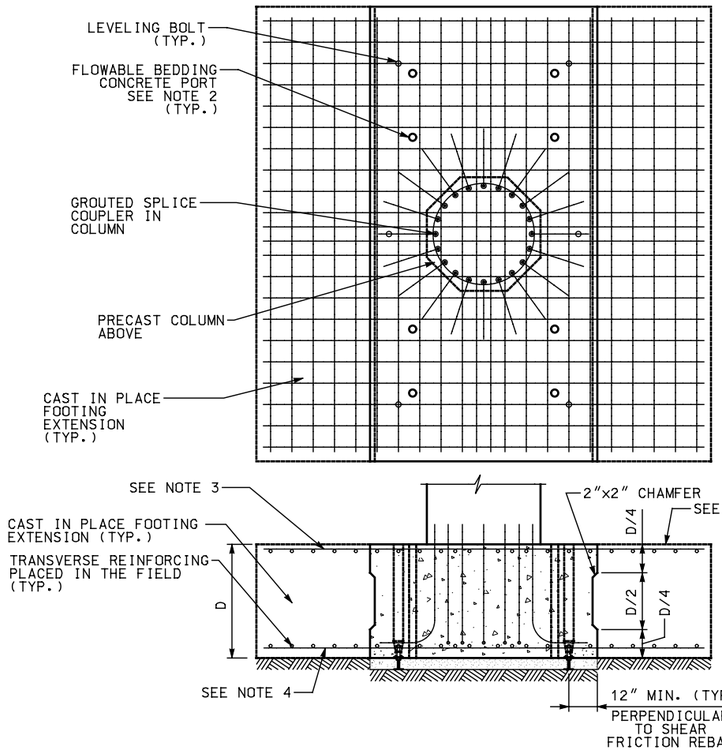
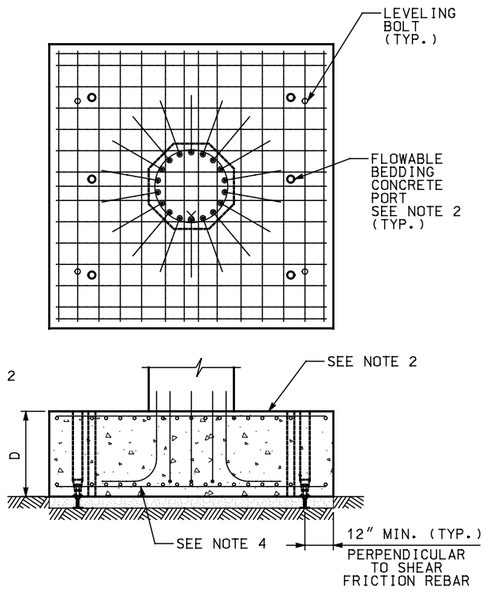
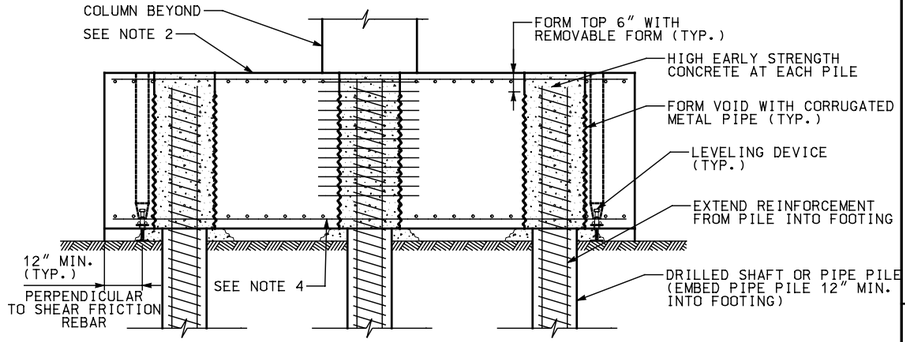


PARTIAL PRECAST SPREAD FOOTING

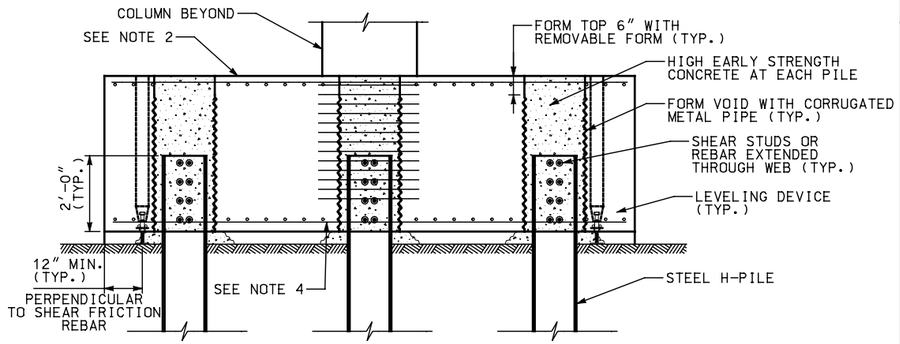


PRECAST SPREAD FOOTING

NOTE: DESIGNER TO LIST SHIPPING WEIGHT ON PLAN SET



PRECAST FOOTING ON DRILLED SHAFTS OR PIPE PILES



PRECAST FOOTING ON STEEL H-PILE

NOTE: WELDABLE REINFORCING STEEL BARS CAN BE FIELD WELDED TO THE PILE WEB AFTER PILE CUT-OFF

PRECAST FOOTING NOTES

1. CONTRACTOR TO DETERMINE SIZE AND SPACING OF PORTS BASED ON MIX DESIGN AND PILE SPIRAL DIAMETER.
2. ERECTION TOLERANCE ON ELEVATION $\pm 1/4"$.
3. DETAIL BAR EXTENSIONS TO THE LIMITS OF THE FOOTING IF POSSIBLE. IF TOTAL WIDTH OF FOOTING AND BAR EXTENSIONS EXCEEDS SHIPPING LIMITS, THEN DETAIL AS LAP SPLICES IN REINFORCING OR ADD MECHANICAL BAR SPLICERS.
4. PROVIDE 3" CLEAR COVER FOR BOTTOM MATS OF REINFORCING.
5. FOR ALL LEVELING DEVICE DETAILS SEE "LEVELING DEVICE - TYPICAL DETAILS".
6. ALL REINFORCING NOT SHOWN IN FOOTING.
7. USE CAST-IN-PLACE EXTENSIONS TO KEEP SIZE AND WEIGHT OF PRECAST FOOTING WITHIN LIMITS.

REVISIONS

NO.	DATE	BY	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
SALT LAKE CITY, UTAH
STRUCTURES DIVISION

DESIGN | CHECK
DRAWN | CHECK
QUANT. | CHECK

APPROVAL RECOMM. — DATE — SENIOR DESIGN ENGR.

APPROVED FOR USE BY UDOT — DATE — UDOT BRIDGE ENGR.

TYPICAL DETAIL SHEET
PRECAST FOOTING
TYPICAL DETAILS

PROJECT NUMBER

COUNTY

F - 1
DRG. NO.

SHT. OF

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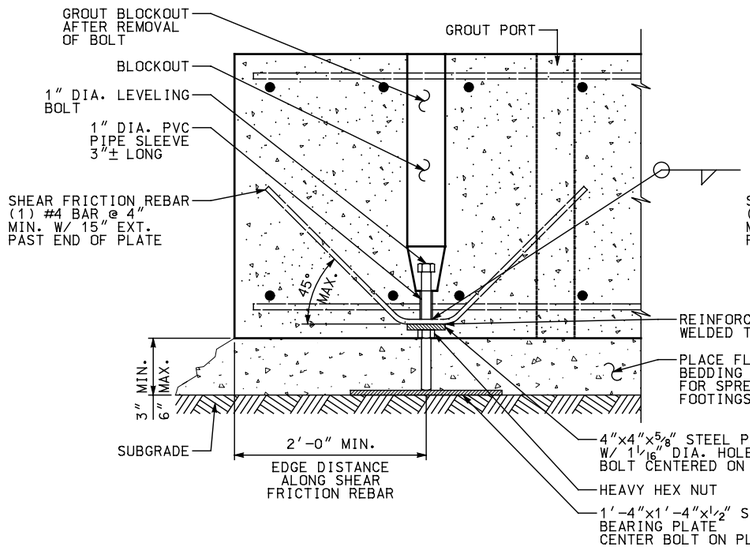
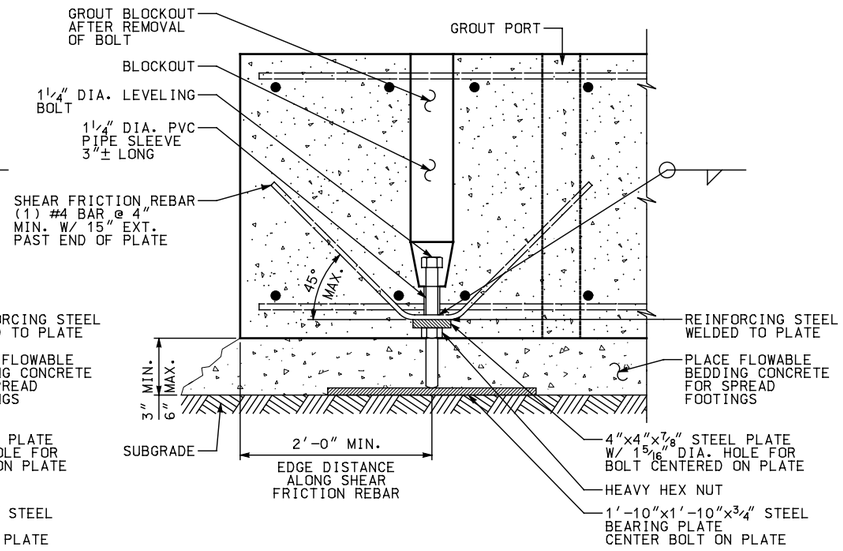


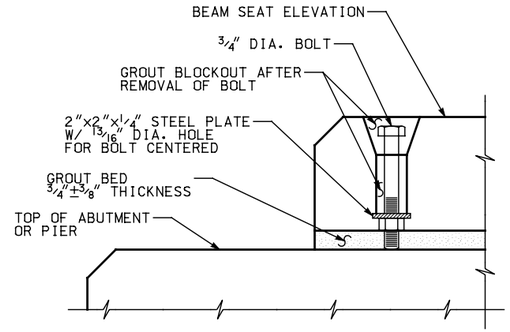
FOOTING INSTALLATION DETAIL
CAPACITY: 10,000 POUND SERVICE LOAD



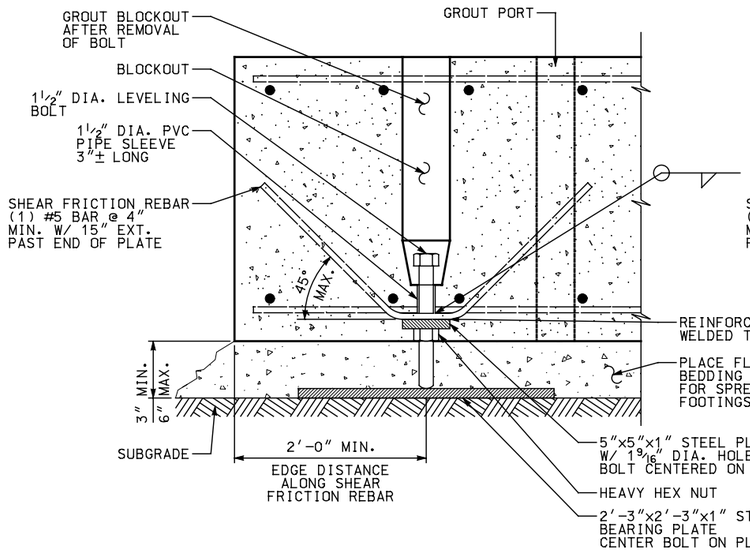
FOOTING INSTALLATION DETAIL
CAPACITY: 20,000 POUND SERVICE LOAD

FOOTING INSTALLATION NOTES

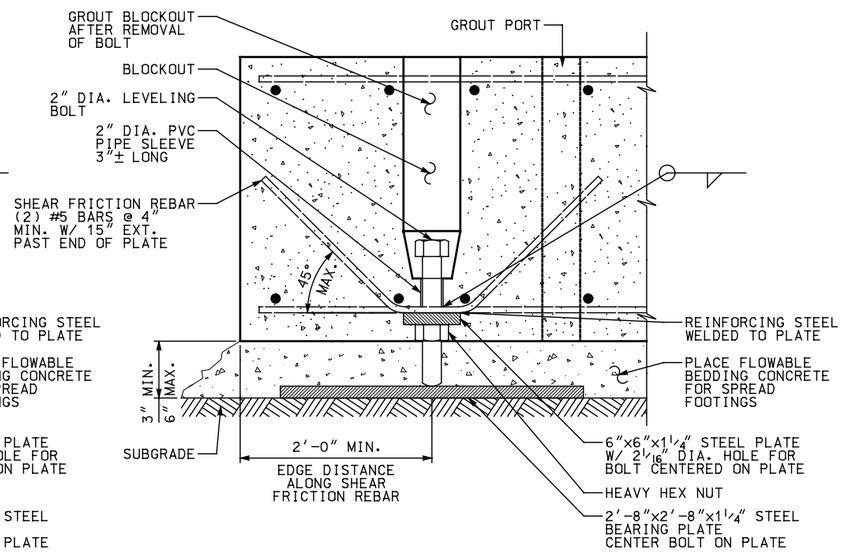
1. ALTERNATE LEVELING DEVICES MAY BE SUBSTITUTED BY THE CONTRACTOR WITH THE APPROVAL FROM THE ENGINEER.
2. ALLOWABLE LOADS ARE SERVICE LOADS.
3. STEEL PLATES ARE ASTM A36. BOLTS ARE ASTM A325. STEEL PLATES TO BE GALVANIZED ACCORDING TO ASTM A123, AND BOLTS TO BE GALVANIZED ACCORDING TO ASTM A153.
4. REINFORCEMENT BARS ARE WELDABLE ASTM A706.
5. GREASE OR OIL NUT & BOLT THREADS TO FACILITATE LEVELING AND REMOVAL.
6. BOLT MAY BE REMOVED AFTER THE FLOWABLE BEDDING CONCRETE HAS SET.
7. BEARING PLATE SIZE AND THICKNESS IS BASED ON A TEMPORARY ALLOWABLE SOIL BEARING PRESSURE OF 6000 PSF. ADJUST PLATE SIZE FOR OTHER SITUATIONS.



BEAM SEAT LEVELING DEVICE



FOOTING INSTALLATION DETAIL
CAPACITY: 30,000 POUND SERVICE LOAD



FOOTING INSTALLATION DETAIL
CAPACITY: 40,000 POUND SERVICE LOAD

NO.	DATE	BY	REVISIONS REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
SALT LAKE CITY, UTAH
STRUCTURES DIVISION

DESIGN | CHECK
DRAWN | CHECK
QUANT. | CHECK

APPROVAL RECOMM. — DATE — SENIOR DESIGN ENGR.
APPROVED FOR USE BY UDOT — DATE — UDOT BRIDGE ENGR.

TYPICAL DETAIL SHEET
LEVELING DEVICE
TYPICAL DETAILS

PROJECT NUMBER

COUNTY

F - 2
DRG. NO.

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